SOCIETY OF ARTS.

FRIDAY, MARCH 18th, 1853.

FOURTEENTH ORDINARY MEETING,

Wednesday, March 16th, 1853.

THE Fourteenth Ordinary Meeting of the Society was held on Wednesday, the 16th inst., Thomas Winkworth, Esq., in the chair.

The following were elected Members :

Bowring, Edgar A., Board of Trade, Whitehall.
Conybear, John Charles, Kew-green.
Grimston, Capt. Leopold, R.A., Woolwich.
Ridgway, John, Cauldron-place, Staffordshire Potteries.
Wilkinson, Joseph, 31, St. George's-road, Borough.

and the names of nine candidates for membership were read.

The following Institutions have been taken into union since the last list was published :

Alton, Mechanics' Institution.
Bury, Athenæum.
Uttoxeter, Literary and Scientific Institution.

Mr. Kilburn exhibited a folding Stereoscope, combining in one case the miniatures, or subjects, and the binocular instrument. The advantages of this contrivance are greater portability, at a less cost ; as by superseding the necessity for an additional instrument, less expense was incurred.

A paper, "On Warming, Ventilating, and Cooking by Gas," by J. O. N. Rutter, Esq., was read.

After adverting to the great facilities which gas offered as a fuel, and the advantages which its use possessed over all ordinary forms of fuel, the author proceeded to observe, that the usual form and construction of gas-stoves for warming, and which have been in use nearly twenty years, may be described as cylindrical, and made of cast or wrought iron, say ten to eighteen inches in diameter, two feet, or two feet six inches in height, with openings at the top and bottom. At the lower end, about three or four inches from the floor, a ring-burner is fixed, pierced, according to its size, with from thirty to sixty holes for supplying jets of gas. In some instances, the top of the stove is finished with an ornamental casting ; in others, with a sliding-valve (professedly) for regulating the supply of heat.

By these means, simple enough apparently, a gas-fire is obtained. Its advantages are said to consist in freedom from dirt and dust ; a great saving of time and labour ; facility of adjustment, so as to obtain any required degree of temperature ; economy as respects cost ; and no necessity for a flue or chimney. Some hundreds, probably thousands, of such stoves have been sold ; and however they may have differed in external form, or internal arrangement, in principle they have been essentially alike.

By the means thus described, a gas-fire warms the air in an apartment ; and if the room be of the ordinary size, and there be not much opening and shutting of doors, a small quantity of gas, say, six to eight cubic feet per hour, will be sufficient to maintain a temperature equal to 60° or 65° in very cold weather. This is done by setting the air in motion—in reality, by heating and then drawing part of it through the cylinder, and diffusing that heat, by the motion thus imparted to the air, among the other parts. All this is easy and simple ; and, with only one very important exception, it deserves everything just now said in its praise. There never has been any mystery in warming with gas in this way ; the only wonder is, that it has been so long practised. But along with the heated air there are also emitted aqueous vapour, and azotic and carbonic acid gases,—the products of combustion common to all the ordinary kinds of light-giving and heating materials. This is the exceptional, and, as ought generally to be known, the objectionable part of the process. That which is so often cited as one of the principal advantages of a gas-stove—namely, there being no necessity for a flue, or chimney—is anything but an advantage, anything rather than a recommendation, and should never be listened to, or adopted.

If it be asked, "How can a gas-stove be more objectionable than a common gas-burner, consuming an equal quantity of gas ?" I reply, that the conditions are not alike. Assimilate the conditions, and even then the objections to the stove would be only partly, not entirely, removed. Let it be remembered, warming by gas implies that the fire must be lighted early in the morning, and kept burning the whole of the day,—at the lowest estimate twice, if not three times, the number of hours an ordinary gas-burner is in use. If it happen that both heat and light are required in the same room and at the same time, the greater the necessity for ventilation, and the more forcible the objection to using a gas-stove without ventilation.

Admitting, for a moment, that the products of combustion from a given quantity of gas are exactly the same, whether the gas be consumed in a burner for giving light, or in another form of burner for giving heat, there are other conditions in the latter case which must not be overlooked. In a gas-stove, the burner is near the floor, whence a current of air is constantly flowing towards it. By reason of its situation and capacity, a great quantity of dust enters the stove. This comes in contact with the gas-jets and the surrounding metal, and is burnt (carbonized), diffusing itself throughout the room. When gas is burnt in small, separate jets, it is difficult to make sure of its perfect combustion. If one jet be defective, the odour of the unburnt gas is offensive ; or if combustion be imperfect (a blue flame), the odour is peculiar, and anything but agreeable. The products emitted from a stove are diffused at a lower level (two feet or two feet and a half from the floor) than those from a common gas-burner. The latter ascend instantly towards the ceiling, their higher degree of temperature impelling them thither, and where they are comparatively out of the reach of the occupants of the room. The former, being at a lower temperature, move more slowly, and thus mix with the air at the lower parts of the room.

As respects the heated vapour and gaseous products emitted by a common gas-burner, it would be much better if they were conveyed out of the room, instead of being diffused within it. This cannot be denied. As a question of quantity, however, it will be acknowledged that

a room, in which a gas-stove is kept burning all day, must be relatively more insalubrious, when lighted up at night, than if no such means of warming had been employed.

It deserves notice, how often every-day practice brings to light compensating conditions which are never anticipated, because they are only known to exist when practice and experience have been the instructors. It is so in the case under consideration.

A house well lighted with gas is more easily, and more effectively ventilated, than another of the same dimensions, with the same arrangements, and in the same locality, but which is lighted with candles. In the former, the walls, and ceilings, and furniture are dry and warm,—the conditions most favourable to spontaneous ventilation, because most in conformity with the natural process in operation out of doors. In such a house it is impossible for air to be at rest. Interchange is constantly going on; cool, pure air, entering from without, and being warmed, and then escaping to give place to a further supply. This process may be assisted by a few simple contrivances for the admission of fresh air. Make sure of that, and there need be no great anxiety about what becomes of the vitiated air. Both kinds cannot occupy the same space at the same time. If cool air gets in, warm air must go out.

Spontaneous ventilation, under the circumstances just described, is not difficult. Not so, however, when a new set of conditions arise; that is, when the purpose is to retain the heated air, instead of facilitating its dismissal.

The preceding remarks are intended to apply to private dwelling-houses. In shops, warehouses, and public buildings, where doors are almost always, or at any rate frequently open, and where there are contrivances for ventilation, inapplicable to private apartments, we may tolerate what we cannot cordially approve. But in such situations it is no more necessary to contaminate the atmosphere, by the products from a gas-stove, than it is in a dwelling-house.

These difficulties or objections may, however, easily be removed. If a stove, similar to that already described, open at the bottom and fitted with a ring-burner, be made perfectly air (gas) tight at every other part, and a tube equally tight, say one and a half or two inches in diameter be attached to it, so as to convey the vapour and gaseous products into a chimney, the object is attained. Such stoves have been in use these eight years; and it is impossible to praise them too highly. The form of stove attended by the best results in producing an agreeable temperature, promoting ventilation, and economizing gas, consists of two, and sometimes three cylinders, so adapted that the heated air circulates between them, which rising first to the top, and then descending about half-way, makes its escape by a flue fixed at the back, or on one side, as is found to be most convenient. By this arrangement a greater amount of surface is exposed to the action of heat, the principal part of which is retained; whilst the dust, and vapour, and gases, are conveyed away. Radiated heat—that which passes through the metal, or other material of which the stove is made—alone enters the room, warming the surrounding air, and setting it in motion, as before described. But in this case it is heat only that is emitted by the stove. Attention and management are necessary; but the proper adjustment of gas-jets according to the size of the room, the temperature required, and the state of the weather, might be known in two or three days; and then the management of the stove need not occupy two minutes a day.

In using gas as a fuel we must not attempt to warm a large room by means of a small stove. The proper degree of heat will not be obtained by consuming an extra quantity of gas, as only a certain quantity of heated air will pass through a stove, according to its size, in a given time. If we try to force it beyond its fair average limits, the metal (or other material) will be over-heated, and emit its characteristic (empyreumatic) odour; some of the gas will escape unconsumed; the interior of the stove will be blackened by smoke, ventilation will cease, and the whole affair become unbearable. In practice it is found that the best effects are obtained when the gas-jets do not exceed three-quarters of an inch in height. They may be less than that, but ought never to be more.

A gas-stove must not be fixed in an open fire-place, as the heat will escape into the chimney. Nor should it be placed immediately in front of an open chimney; or supposing it to be partially or entirely stopped, the tube (flue) belonging to the stove must not pass direct to the chimney by the shortest route. A knowledge of this is important. If the stove be so connected with the chimney, or wall of the room, that the exit flue be only one or two feet in length, a great portion of the heat will be wasted. It is of no consequence at what particular part of a room the stove be fixed. Comfort, convenience, and the realization of the best effects ought to determine that. But the flue (tube) should not be less than 6 feet, and it will be all the better if it be 10 or 12 feet in length. The flue thus forms part of the stove, extending the radiating surface, and parting with heat so quickly that at one foot from the stove the temperature will be, say, 130°, but at ten feet only 70°. In this way the heated air and offensive products are conveyed out of the room; whilst probably seven-eighths of all the heat generated by the gas is retained within it. On this principle the use of gas as a fuel can alone be economical as respects cost, when compared with coal and coke. It is impossible to keep up a fire with ordinary fuel that shall produce exactly the same degree of heat, and distribute it as equally over a given period, as can be effected by gas. The waste of heat in an open fire-place, whatever its size, or shape, or other peculiarities, is scarcely ever less than one-half, and very frequently a great deal more. Here it is that the use of a gas fire contrasts most favourably with a common fire; and if properly applied, its advantages would soon be discovered.

Difficulties will present themselves, and objections be made, on account of the length of the flue here recommended; and in some cases, perhaps, it will be considered so great a violation of good taste, that, whatever the consequences, it will be dispensed with. It is a choice between an open stove, diffusing a vitiated atmosphere, over-heating the room, and de-

positing vapour on the windows; or a close stove, warming the air of the room, without impairing its salubrity, ventilating as perfectly as it warms, doing no injury to the most costly furniture or delicate colours, and creating sensations of comfort which, when once experienced, are not easily forgotten.

A gas-stove must be looked upon as a temporary arrangement. One of its benefits consists in the ease and quickness with which it can be fixed, and, when done with, removed. Many little contrivances may be resorted to for concealing, or abating, the unsightliness of the flue. If it be painted to harmonize with the walls or furniture of the room, there will not be much cause for complaint.

Supposing the room to be warmed has neither a fire-place nor a chimney, the flue from the stove might be carried into a chimney which has a quick draught in some other part of the house. If it cannot with propriety be conveyed overhead, it must descend; passing between the ceiling and floor, or penetrating both. The distance is of little consequence. A flue will act perfectly if it be fifty feet long.

A few cautions are necessary. Whatever be the direction, or length of the flue, let the quantity before mentioned, say six to twelve feet, be kept in the room with the stove. In its course, whether rising above the room, or descending below it, special care must be taken to incline the tube downwards towards the chimney it is to enter. This is to insure the perfect drainage of the condensed vapour. A fall of about one inch in every ten feet will be sufficient. The tube should not, by choice, be taken out of doors in any part of its route to the chimney. If it must be so, let it be well protected; that is, kept dry and warm. A kitchen chimney, or any other constantly in use during winter, is sure to answer. It is useless to attempt to make a gas-stove succeed properly if the flue be taken through the wall, or roof, into the open air. Iron tubing is in every respect preferable to any other. It is made expressly for the purpose, in lengths varying from one and a half to twelve feet, which screw together, and can be fitted up as easily as gas-tubing. A valve should be fixed in the flue (tube) at about two or three feet from the stove. This is to prevent smoke or cold air entering the room when the stove is not in use.

The author then compared the relative cost of warming by gas and by coal, and alluded to the safety of gas-stoves. Other kinds of close stoves, he said, were attended with danger; scarcely a week passed, during cold weather, without some terrible accident from over-heated flues. It was next to impossible to make the flue of a gas-stove so hot, at eight or ten feet distant, as to do the slightest injury.

By means of a gas-fire, a greater quantity of heat can be made available, and more uniformly distributed over the different parts of a house, than by an open fire. If the products be conveyed away in the manner here explained, there will be warmth accompanied by ventilation. The exact temperature required, by day and night, can be calculated on with certainty. There are no dust, dirt, noise, or other sources of annoyance, and consequently no cleaning required. The air that comes in contact with the stove is only warmed—not heated—and therefore it never produces dryness of skin or headache.

Nothing is more deceptive than an agreeable temperature, when it can be obtained by apparently simple and inexpensive means, and without the inconvenience of smoke and other troublesome accompaniments. Hence the continued use of portable stoves and the "prepared fuel," (in reality charcoal,) than which nothing can be more deleterious. Azotic and carbonic acid gases are invisible; but because they are not seen, they are not the less dangerous.

A gas-fire that can be seen,—resembling in some respects the common domestic fire,—commends itself to our feelings, and identifies itself with many pleasant associations. The skill, and taste, and energy lately put forth in devising and improving various articles of gas apparatus are quite equal to the task of constructing a stove in which the fire should be seen, although it be enclosed, and which should diffuse heat only, unattended by, and unmixed with, vapours, odours, or other products of combustion. Until this, or something even better be accomplished, let us not boast too much of sanitary improvements. To little purpose shall we construct sewers and drains for conveying away that which is unsightly, as well as offensive, at the lower parts of the house, if nothing be done to keep up a good supply of pure air at the other parts. We may seem to be very much in earnest, in keeping out that which makes its presence known by unmistakable proofs, whilst no efforts are directed towards the expulsion of a foe far more insidious, and, therefore, much more dangerous.

No greater dis-service can be done to the science of gas-lighting than by the very general and indiscriminate use of gas-stoves in dwelling-houses, unless accompanied by effective ventilation. Equally true is it that nothing is more certain to increase the sale of gas than a judicious, healthful, and philosophical adaptation of it to domestic warming, ventilating, and cooking.

Mr. G. Lowe remarked that gas stoves were more beautiful, convenient, and economic than coal fires, and expressed a hope that the greatly reduced price and increased purity of gas at the present day would have the effect of bringing them into general use. He coincided with Mr. Rutter's remarks as to the impurities of gas, and referred to a statement he had made in the *Philosophical Magazine* of as far back as 1818, to the effect than an Argand burner, when reduced to a blue flame, gave off something, which he at that time, for want of a better name, called Lampic Acid, but which they were now informed by chemists was Aldehyde. This it was necessary to get rid of, and every one would admit that it was better it should go up a chimney than up the nostrils.

Mr. Varley said the question of warming and ventilating by gas at first seemed to present the anomaly of pumping water to turn a mill, as a portion of the coal was burnt in order that another portion might be obtained for domestic use. But if it could be justified on the ground of economy, he thought the convenience and cleanliness of the system must speedily recommend it to the public. He was glad that Mr. Rutter had spoken so clearly on the subject of ventilation; for when it was remembered that one candle burning consumed as much air as a man, and a large gas-burner manifestly more

than that, it must be evident that some means of getting rid of foul air and supplying fresh air was imperative. He then referred to the plans for ventilating introduced by Mr. Gowland and Professor Faraday, but considered that that recommended by Mr. Rutter was simpler and cleaner than either.

Mr. GORE had paid some attention to the subject, and quite agreed with the remarks of Mr. Rutter. He was afraid, however, that the audience had scarcely been sufficiently cautioned against the indiscriminate use of gas stoves for heating apartments. During the last eighteen months he had attended to the fixing of between thirty and forty stoves of all classes, from those styled self-ventilating stoves requiring no flue, to those which were all flue, and, as had been remarked, carried off the heat as well as the impurities, affording scarcely any warmth at all. In the first there was no ventilation, and the air of the room was impregnated with this lampic acid, and in the last about four-fifths of the heat was lost. The object was, then, to get a sufficient amount of radiated heat for the purpose of warming, whilst ventilation was effected. Recently he had tried the experiment of placing a small gas stove without a flue, into one of Dr. Arnott's stoves, by which warmth, cheerfulness, and ventilation had been secured. He explained the impropriety of bringing an iron flue in contact with the open air. Iron being unlike brick, a good conductor, became readily chilled, and a vacuum being thus formed in the flue caused a rush of cold air into the room, which also carried with it all the impurities they wished to get rid of. He was glad the question had been brought before the Society, and trusted that the inquiry would be prosecuted, and one of the essential objects of the Society — the application of science to the purposes of every day life—thoroughly carried out.

A Gentleman in the room referred to the use of wire gauze for admitting and distributing cold air. In reference to the modes of burning gas, he believed there were three: the first, in which the combustion was incomplete, much of the carbon passing off in the form of smoke; the second, when the combustion was complete, and a brilliant light was produced; and the third, where there was a blue flame. He wished to ask Mr. Rutter, which was the best and most efficient mode of burning gas?

Mr. ASHPITEL said, this subject derived a peculiar interest from the fact that it had occupied much of the time of the late John Sylvester for some time before his death; and an invention of his would shortly be made public, which would embody much of what had been stated as desirable by Mr. Rutter. He could not now enter into the details; but he might remark, that it would dispose not only of the azotic impurities, but also of the aqueous vapour, the presense of which all the previous speakers appeared to have overlooked. This could be done without a chimney, by a process analogous to filtration. The peculiar "irony" smell, common to almost all stoves, might be got rid of by having two thicknesses of iron, with water between, which would prevent the outer surface from becoming overheated, and thus emitting the unpleasant odour. To compensate for the check to the diffusion of heat thus caused, radiating surfaces, called "gills," would be used.

Dr. BACHOFFNER said, nothing could be more objectionable than gas stoves without flues, and sometimes even with them, when chimneys were so ill-constructed as under some circumstances to have a downward instead of an upward draught. He then referred to the strong prejudice of the English in favour of open fires, and explained a plan of which he was the co-inventor, whereby this object and ventilation were both obtained. He believed inquiry on the subject was progressing in the right direction, and hoped in a few years that a gas fuel would be discovered which would render gas fires at once cheerful, cheap, and useful, and as numerous as gas-lights were now.

Mr. STRODE could not agree with Mr. Rutter's remarks in regard to carrying iron flues into the open air. His experience as a practical gas-fitter had convinced him that it might often be done without bad results. He explained a plan which he had successfully used for preventing down draughts. At the bottom of the stove he had an air-chamber, which was placed in communication both with the outer air and with the flue,—this he had never found to fail.

Mr. MEADE thought that the prejudice in favour of open fires might easily be removed by proper explanation of their disadvantages. In regard to the means of getting a sufficient length of flue in the room to heat it, without being in the way, or looking unsightly, that might be done by making the flue in coils. The plan of having water between two thicknesses of iron was impracticable, because from the necessary variations of temperature there would be danger of explosion if it were entirely confined, and if not the room would be filled with steam. In regard to cooking, of which little had been said, a great prejudice would have to be overcome, on the ground of the smell. As to the cost of cooking, a gallon of water might be boiled for a farthing; three quartern loaves baked for a penny, and a joint of meat, weighing five or six pounds, cooked for the same sum.

After a few remarks from the Chairman on the history of Gas-lighting, a vote of thanks was passed to Mr. Rutter, for his paper.

Mr. RUTTER in responding, after acknowledging the vote, said, that as to the wire gauze he believed it was simply useless. The best mode of burning gas so as to get the most heat at the least cost, he believed to be by bright, full combustion, and not by the blue flame. In regard to Dr. Bachoffner's allusion to bad chimneys, he had stipulated in his plan for a good one, as necessary to satisfactory results.

The Chairman announced that the Society would adjourn over the Easter Holidays; and that the next meeting would be held on Wednesday, April the 6th, when a paper would be read by Professor Wilson, "On recent Improvements in the manufacture of Flax."

EAST INDIAN EXHIBITION.

At the special request of the Council, Mr. Winkworth, Chairman of the East Indian Exhibition Committee, has recently visited the Hague and Leyden, in company with Mr. Roney, for the purpose of soliciting the aid of the Dutch Government in favour of the Indian Exhibition; and to request permission of His Majesty the King of the Netherlands, that selections from the very valuable and unique collections of Eastern articles, preserved in the museums of the Hague and Leyden, might be entrusted to the Society for the purpose of being exhibited in the "East Indian department of the Great Dublin Exhibition."

At the meeting of the Council, on the 16th inst., Mr. Winkworth reported the complete suc-

cess of his mission, and stated that the request with which he was charged, had been granted in the most gracious and liberal manner.

The following letter from Mr. Winkworth, and the official reply of M. de Thorbecke to the application of Messrs. Roney and Winkworth, will be read with interest; and the Society may with reason be congratulated on the manner in which their request has been met by the Dutch Government, which, at the same time that it adds a most valuable and important contribution to the increasing collection of Eastern productions, forming by the Society, affords a gratifying example of the friendly interchange of international civilities.

(TRANSLATION.)

The Hague, March 5, 1853.

GENTLEMEN,—I have received the catalogue of the Eastern objects contained in our Museums, which you desire to exhibit in the Industrial Exhibition which is shortly to take place in Dublin.

The Government of His Majesty the King of the Netherlands, is happy to be associated in an enterprise which has the approbation of Her Majesty the Queen, His Royal Highness the Prince Albert, and the British Government, and which cannot fail to lead to the most beneficial results.

It is therefore with pleasure, Gentlemen, that I comply with your request, and shall place in your hands the articles in question, during the Exhibition.

I have entrusted M. Van de Kasteele, the Director of the Royal Museum at the Hague, with the care of conveying and accompanying these articles. It is understood that all the cost of packing and transit, both to and fro, as well as the expenses of M. de Kasteele, are to be defrayed by you.

The Minister of the Interior,

(Signed) THORBECKE.

To Messrs. C. P. Roney, Esq.,

Secretary to the Industrial Exhibition at Dublin; and T. Winkworth, Esq.,

Treasurer of the Society of Arts, in London, and Chairman of the East Indian Exhibition Committee.

Paris, March 11th, 1853.

DEAR SIR,—I have the pleasure to announce to you the successful termination of the mission of Mr. Roney and myself to the Hague.

Immediately on our arrival, we put ourselves in communication with Sir Ralph Abercromby, Her Majesty's Ambassador to the King of the Netherlands, by whom we were honoured with an interview the same evening. We stated the object of our visit, into which his Excellency cordially entered, and promised us all the assistance which his position afforded.

We accordingly received from him, on the following day, an introduction to the Minister of the Interior, M. Thorbecke.

We explained to him the wish of the Society of Arts to have the means of adding to their intended contribution of a collection of Indian and Eastern products, to the "Great Industrial Exhibition, of 1853," in Dublin, a selection from the celebrated Museums of Holland, of objects of Japanese manufacture and design. This desire, we represented, was the greater, from it being well known that the Collection at the Hague is unique, possessing also an historical interest, owing to the early connection of the Dutch with Japan, Java, and other Oriental settlements. We stated that the proposed Exhibition, though originating with, and being at the sole expense of, a patriotic individual, Mr. William Dargan, was not a commercial speculation; but, being placed under the entire management of an independent Committee, had received great encouragement from her Majesty the Queen, the Prince Albert, and the Government of Great Britain.

His Excellency listened with attention; and after a short discussion, requested us to visit the Museums at the Hague and at Leyden, and to give him a list of the articles we thought most suitable for our purpose.

While doing this, we availed ourselves of the advice and assistance of the Directeur du Musée Royale, M. Kasteele, and finally presented to M. Thorbecke the catalogue he required.

We received shortly afterwards a verbal message of consent to our application on behalf of the Government, and which has subsequently been confirmed in writing, as will be seen on reference to the accompanying copies of the correspondence.

It now only remains for me to bear grateful testimony to the kind assistance received from Sir Ralph Abercromby and M. Kasteele, and to congratulate the Society of Arts on having been the medium of obtaining the loan of a valuable collection of curiosities, no portion of which has ever before been permitted, since its formation, to leave the shores of Holland. I am, dear Sir,

Yours truly,

THOMAS WINKWORTH.

Edward Solly, Esq., F.R.S.

NOTICE TO INSTITUTIONS.

The Society has received through Messrs. W. and F. G. Cash, the publishers, a number of copies of a work by the late M. Frederick Bastiat, Member of the Institute of France, intitled "Essays on Political Economy," for distribution to the Institutions in Union. They will be inclosed in the next parcel.

HOME CORRESPONDENCE.

DUTY ON PAPER.

SIR,—The Circular issued by the Council on the suggestion of the Institute's Committee, the recent Lecture on the manufacture of paper, and the discussion which ensued, induce me to believe that a few remarks on the repeal of the duty may not be inopportune, the subject being evidently under the consideration of the Society.

The question may be treated in three aspects, as it affects paper-makers, the middlemen, and the public. One peculiarity of the paper-manufacture is, that by its means an article which otherwise would be useless is converted into a commodity of great utility and considerable value. The prices of rags, rope, bagging, &c., I understand are about 35*s*., 24*s*., 16*s*., 8*s*., and 4*s*., per cwt., according to the quality; and when, by industry and skill, they assume a new form, the Government requires payment of a duty of from 50 to 350 or 400 per cent. upon their value as raw materials, such raw materials depending upon the fact of the existence of the manufacture for their having any value at all. If we take the paper when made, the duty being at a fixed rate per pound (1½*d*. and 5 per cent.), without distinction of quality, it occurs that on the intrinsic value of the manufactured article the proportion of duty varies from 50 to 17 down to 5 per cent. Consequently, before some descriptions of goods can be brought into the market more than three times the worth of the raw material, and half the value of the manufactured paper, must have

been paid in cash as duty to the Government; and this applies particularly to the inferior class of papers. It thus appears that for every 1,000*l.* paid for materials, the maker must estimate a further expenditure for duty, varying from 1,000*l.* to 2,000*l.*, before he can realise the result. This is a very heavy tax upon his capital. Not only does the duty cripple the manufacturer, by causing a large demand upon his resources for cash, but further, the constant recurrence of visits from an inexorable creditor gives rise to a false competition in the trade. I will illustrate this point by a case not at all unfrequent:—A paper-maker has to prepare for the visit of the Excise-collector; the duty must be paid to the day, nay, to the hour; he may have stock. paper, &c., one hundred times the value of the duty, but from various circumstances it may not be convenient to pay so large a sum in cash. The case, however, being imperative, what is his position? He is at the mercy of the moneyed purchaser,—such being always to be found, though at very reduced prices; and the latter is thus enabled to introduce goods into the market considerably below their just value. If there were no duty, the necessitous might be compelled to sell below the fair price; but it cannot be questioned that the periodical drain of a large amount of cash, causes the anomalous, but nevertheless certain fact, that paper may be frequently bought cheaper than it can be profitably manufactured. An end comes in any given instance; but other cases arise, and they all tend to the injury of the manufacturers, who pay the duty and their other demands. If a return could be obtained from the Excise-office, setting forth the number of persons proceeded against for non-payment of duty, and those prosecuted for frauds in attempting to evade the duty, I have no doubt it would be found that ten come under the former class, to one under the latter. Manufacturers who have large capitals are not thus inconvenienced, and therefore do not advocate a repeal of the duty; but these remarks are applicable to a very large proportion of this industrious community. The views of the larger makers are influenced by the fear of competition with the continental manufacturers, who pay an import duty of 4½*d.* per pound, and five per cent. The repeal of the duty would cause such an impetus to the manufacture, and would so release capital, that the result, except perhaps in some few instances, would not be deleterious; even if it were so, I may be allowed to express my opinion, that in obedience to those great laws of natural adaptation, if we cannot compete with other nations, the manufacture must cease to be regarded as a speciality of this country; if we cannot make as cheap as others, it is not our mission to manufacture for the world. As Belgium, France, and Spain, prohibit the exportation of rags, it would be just, in the event of the Customs duty being taken off, to insist upon their opening the trade in rags, otherwise the paper-makers of those countries would enjoy a bounty in the shape of cheap material at the expense of the other inhabitants of the respective nations. The manufacturer is also subject to inconveniences from the Excise regulations, the principal being the delay which takes place in consequence of the notices for charging, the time the paper is required to be kept after charging, before removal is allowed, in order that a superior officer may have an opportunity to re-weigh, &c. The infringement of these regulations, even when no duty is lost, renders the offender liable to penalties.

Yours, &c.,

WAIMA.

DUTIES ON PAPER, NEWS, ETC.

SIR,—The repeal of the fiscal restrictions on paper, advertisements, news, and foreign books, must be a subject of interest to the Society of Arts, now that it has established a Journal of its own. That such taxes exist, apart altogether from the question of their amount, is a reflection upon our age and country; nor does it require any rhetorical arts to render patent to all the grossness of a financial system which opens the ports for the sake of our bellies, but stints and deteriorates the food of our minds. We are told, by higher than human authority, that "man doth not live by bread alone;" and if the people are excluded, by unequal laws, from the enjoyment of sound knowledge as widely and as cheaply disseminated as possible, who are bound to come forward and befriend them? I say the learned Corporations, Societies, and Institutions with which this country is so abundantly provided, and who are the natural guardians of the intelligence of the nation,—the public at large have hardly yet learned to carry the principle of agitation for reform into matters affecting their intellectual wants, and the interests that have grown up under a vicious system are more or less afraid of encountering changes the exact results of which they cannot foresee. Yet to men of enlightened minds, it cannot at this time of day be doubtful that literature, like everything else, must be benefited by the removal of fiscal restrictions; and in a philosophical point of view, taxation of the products of human thought is even more odious than that on food, or air, or light. It may be argued, that as the different bodies for the promotion of science and art are divided into specialties, they are precluded from ranging beyond the subjects which fall within their respective provinces; that the civil engineers should confine themselves strictly to civil engineering, the Geographical Society to geography, and the antiquarians to antiquities. But surely a common interest, which touches them all in a greater or less degree justifies a common concern with regard to it; nor should any department in the circle of knowledge be indifferent to what presses injuriously on the whole We are told by foreigners, and we flatter ourselves that in this country the art of combination for public objects is better understood than in any other part of the world; yet it seems strange that with such an organisation as we possess, ramified into every section of the field of science, the tax-gatherer should still be permitted to take toll upon the intelligence of the community. Mrs. Jellaby was so pre-occupied with the correspondence and cares of her South African mission, that her domestic affairs were left entirely to find their own solution, which they did in the bankruptcy of her husband and in her children's rags. I am afraid it is undeniable that our learned bodies have all more or less of Mrs. Jellaby about them, the characteristics of that respectable female becoming more manifest with their age and exclusiveness. [Strange indeed are the means by which the march of intellect is carried forward. Not to travel out of the present time, we find stately commissions issuing from the Crown to reform the abuses of our great Universities, educated and enlightenened enough, one would fancy, to render any interference of the kind impertinent. We see, too, a poor schoolmaster, strong only in the justice of his cause, squeezing from a rapacious capitular body funds dedicated to instruction which they had misappropriated, and then lifting the veil sufficiently to show that his is but one illustration of a wide-spread system, in which money set apart for the education of the people has been swallowed up by the Church. Look back a little along the high stream

of public intelligence, and what do you behold? A mighty contest as to how the youth of the nation shall be taught, and the ministers of every religious denomination engaged so furiously in the struggle, that the powers of ignorance retain their old ascendancy. Over that contest, the learned bodies of the country have coldly held aloof, and if ever it is decided satisfactorily to the community, it will probably be by the ratepayers taking the question into their own hands and settling it, as they have already done in some districts of the North.]

To one who considers all these matters attentively, the only wonder is, that we are as well informed as we find ourselves — that public intelligence is so matured, and in so sound and healthy a state. How is this mainly to be accounted for? Not certainly by the agency of University Drones, and sleepy Societies that prose and maunder their time away, read dreadfully heavy papers at their hebdomadal meetings, and publish once a year unsaleable transactions. A great power has arisen in this free kingdom during modern times, and spread throughout the world, dedicated to the public service—potent for good—comparatively impotent for evil—moulding opinion, directing and stimulating progress; informing and elevating society. These are its aspirations at least, and no one can doubt that they have been partially realised. That power is the press—a mighty influence—struggling through contempt, hatred, and indifference, to be the instructor of nations, and to right mankind. It has suffered dire persecution, and still bears the burdens of many wrongs—imprisonment, suppression, exile, fine, abroad—ruinous taxation, and indirect oppression at home. The hand of Government is heavy upon it everywhere; and even here, what the censor and the policeman spare, the exciseman plunders. By its aid we have won many of our dearest and most precious privileges; yet who is grateful, or helps it in return? What have our learned and scientific bodies, our Associations to promote the Arts, done for the Press? Where is that intelligence, that liberal high-mindedness which might be expected in such Institutions? Have they averted the operation of laws which leave no alternative to Journals between degrading dependence and arrogant monopoly; which lower the social status of Journalists; which stint the amount, and deteriorate the quality of public news. We are told, that if the press were free the government of the country would be an impossibility; and I am willing to admit that the sense of intolerable wrong has made its tone sometimes too rampant, yet why fear the increased action of a power which has heretofore been so salutary? It has been universally conceded that former reductions of the burden of taxation upon the press have been invariably followed by a vast improvement in its character, by more elevated views on all social questions, and a juster and more moderate treatment of whatever provokes its opposition. No sensible man can doubt that that would continue to be the case were the taxes on knowledge entirely removed, and that public opinion is sufficiently powerful to correct, in its own organs, any abuses or errors into which from time to time they may fall.

We have adopted, without much consideration, very exaggerated notions as to the excellence of the press of this country. Yet, is it what it ought to be? What proportion of our journals, I should like to know, is independent of party or clique, or class interest, or personal ambition, or some other influence damaging to the character of such undertakings? Is it not the case that some of them do not pay their expenses; and why, and how, are they kept up if they are losing concerns? It cannot be doubted that a system which leads to the support of journals, that as commercial speculations do not answer, is inherently vicious. The known pecuniary dependence of some, throws a slur upon the character of all. Journals, that are self-supporting, can screw down their staff to the same scale of remuneration as that of journals which live upon the crumbs of official favour; or the gossip of the clubs, or the superfluities of capitalists, with a mania for political influence. Journals that are not self-supporting, eke out their miserable subservient existences in a variety of ways. Some levy toll upon the vanities of the fashionable world, and the aspiration of new-born wealth to get a footing there; others are reproduced under another title, and the stale matter is sold at the same price as if it were original. Puffing advertisements still find their way into many, under the guise of an editorial sanction. The privilege of theatrical admissions is converted into a wholesale system of bribery and touting for advertisers. Books sent by publishers to be reviewed (a large proportion of which are never noticed), become an important perquisite, and therefore criticism loses all its vigour and usefulness by being disarmed of its censures. Some journals suffer from a plethora, and are obliged to keep down their circulation to prevent apoplexy; others are starving in the midst of abundance, and but for unblushing piracy would die miserably for lack of matter, I cannot call it food. The avowed regard for quantity rather than quality, I take of itself as an evil in the present state of the press; which can hardly be exaggerated; for it imposes a heavy burden upon the time of readers, who have to wade through a deluge of trashy verbiage in order to avoid missing what is really important or interesting. The limits of a letter warn me to contract my observations on this branch of the subject; yet there is so much to find fault with, that I hardly know where to stop. I might show how the Press, driven by its dependent and fettered condition to do so, has given an exaggerated attention to political rather than social questions,—how industrial interests have been neglected by it,—how, with a few exceptions, the useful distribution of its powers and the desirable variety of its forms and materials have been neglected. I might take the Daily, the Weekly, and Provincial Press in succession, and point out their shortcomings,—and perhaps in that survey the feeble little bantling organ of this Society might not escape observation. The baneful influence of the Taxes on Knowledge as they are called is everywhere visible; and the public mind, that ought to be nourished with the best and most wholesome intellectual aliment, is in the main condemned to feed on a coarse, stale, and dear *réchauffé* of news. If you want a clear and convincing proof of this, look at the systematic and unblushing piracy of articles resorted to,—the unscrupulous use of paste and scissors,—so long practised, that people seem actually to have lost all perception of its immorality. The public are deeply interested in the power, the purity, the independence, the originality, and the cheapness of Journalism. The learned bodies, and the Societies and Institutions, into which the intelligence of the community is collected, are just the parties who can and should combine to emancipate the Press. The Society of Arts especially is marked out for this work, and I am glad to see it is about to undertake it. I find, from the last Report of the Royal Commission, that there are in and around this metropolis about 100 Institutions, having an annual revenue of 160,000*l*., devoted to the promotion of Science and the Arts. I find that this Society itself is now in union with 259 Local Institutions spread all over the

country. Why should this immense organization not join together to set Knowledge free? In such a cause their union would be irresistible,—their success the triumph of a noble principle; and they would give to the public a guarantee much needed,—that useful and practical results are sometimes to be got out of learned bodies.

I am, Sir,
Your obedient Servant,
A NEWSMONGER.

STATEMENT SHOWING THE EXTENT OF THE PRESENT FISCAL RESTRICTIONS ON PAPER, ADVERTISEMENTS, AND NEWSPAPERS, BORNE BY THE PRINCIPAL INSTITUTIONS OF MANCHESTER:

Paper duty—	*Athenæum.* £	s.	d.	*Mechanics' Institution.* £	s.	d.
Newspapers	26	9	6	11	0	6
Books and Periodicals . .	6	5	3	7	6	0
Stationery, Schoolbooks, &c.	11	7	9	16	3	0
	44	2	6	34	9	6
Newspaper Stamps . . .	65	0	0	31	4	0
Advertisement Duty . .	9	0	0	10	0	0
Total per Annum .	118	2	6	75	13	6

Of 300 English Newspapers received weekly at the Athenæum, only 96 are transmitted through the post. Of 144 received at the Mechanics' Institution, only 41 are received through this channel. The stamp is of little value for postal purposes, as Newspapers are supplied at the same cost to the Institution as when transmitted by the Newsvender's express parcel.

J. W. HUDSON, PH. D.

Lancashire and Cheshire Institutional Association.

LUCIFER MATCHES.

SIR,—I have just received, from a Lucifer-match manufacturer, a box of Lucifer-matches, in the production of which the red, or amorphous phosphorus, is used, instead of common phosphorus.

The importance of this communication will appear from the following facts:

It has been estimated, that the English and French manufacturers of phosphorus are now producing at the rate of 300,000 lbs. of common phosphorus per annum, nearly the whole of which is consumed in making Lucifer-matches.

In compounding the emulsion for tipping the matches, the German manufacturers make three pounds of phosphorus suffice for five or six millions of matches. If we suppose only one-half of the French and English annual product of phosphorus to be employed in making matches, this will give us 250,000 millions of matches as the annual product consequent on the consumption of one-half of the French and English phosphorus.

We need not suppose this to be an exaggerated statement, when we consider the daily product of some of our match manufactories. I have lately had occasion to describe the processes of a London factory, which produces 2,500,000 matches daily. For this purpose, 14 3-inch planks are cut up; each plank produces 30 blocks; each block—of the dimensions, 11 inches long, 4½ inches wide, and 3 inches thick—produces 100 slices; each slice, 31 splints; each splint, 2 matches: thus, we have $14 \times 30 \times 100 \times 31 \times 2 = 2{,}604{,}000$ matches, the day's work of a single factory in London. At Messrs. Dixon's factory, near Manchester, from 6,000,000 to 9,000,000 of matches are produced daily.

There are, at least, four very considerable makers of Lucifer-matches in London and its vicinity, and a large number of small makers. There are also manufactories, of varying degrees of importance, in many of the large towns of this kingdom, the largest being that at Manchester, above named.

On the continent of Europe, manufactories of matches have spread in a remarkable manner from Transylvania, on the borders of Turkey and near the Black Sea, to the inland lakes of Sweden, and the Finland shore of the Gulf of Bothnia. In the United States of America, and in Central America, these factories are also to be found. The trade is most flourishing in Germany; and, in order to encourage it, some of the governments sell the timber of their forests at a merely nominal price. The German export-trade is rapidly increasing. The manufacturers have their agents stationed wherever there is a considerable demand for matches. Large quantities are imported into this country; and being well packed in cheap but substantial cases, they are carried by the railway companies as *toys*, while the produce of our own manufactories is frequently refused to be conveyed.

In the manufacture of Lucifer-matches, the splints are first tipped with sulphur, and then with a composition formed of phosphorus, chlorate of potash, and colouring matter mixed up with glue. This composition is spread out upon a stone slab, heated by steam, and the matches, mounted in frames to keep them separate from each other, have their ends dipped into this composition. The matches are then dried in a hot room, and afterwards packed in boxes for sale.

All the persons engaged in the factory are thus, more or less, exposed to the fumes of phosphorus. The effect of this exposure is to induce a disease which, to quote the description of a medical man, "is of so insidious a nature, that it is at first supposed to be common toothache, and a most serious disease of the jaw is produced before the patient is fully aware of his condition. The disease gradually creeps on, until the sufferer becomes a miserable and loathsome object, spending the best period of his life in the wards of a public hospital. Many patients have died of the disease; many, unable to open their jaws, have lingered with carious and necrosed bones; others have suffered dreadful mutilations from surgical operations, considering themselves happy to escape with the loss of the greater portion of the lower jaw."* I will not shock your readers with any further surgical details. I will merely remark that, at the present time, and in one factory, a young man and a young woman have resumed their work, each with the loss of the lower jaw; and I am assured that such cases are by no means uncommon, as our hospitals and infirmaries can testify.

Now, what is the remedy for this fearful state of things? Improved ventilation of the factories, habits of cleanliness and temperance on the part of the operatives may mitigate the evil; but when it is stated that the clothes of the persons engaged in the dipping-room, and the hands of the children engaged in boxing the matches, present a luminous glow in a dark room, it is evident that plans for improved ventilation, &c., will not insure impunity to persons thus exposed to the fumes of phosphorous acid during sixty or seventy hours per week. A number of small makers, occupying garrets and kitchens, are, it is to be feared, constantly exposed to these noxious fumes.

Nor is the jaw disease necessarily confined to the poor operatives. We have heard of children having taken it simply by playing with the matches; others have been killed by sucking them: but, in this case, orpiment (one of the sulphurets of arsenic) had probably been used as

* Mr. Harrison, in the "Dublin Quarterly Journal of Medical Science," for August, 1852.

an ingredient in the composition instead of sulphuret of antimony. But there is, perhaps, not a house in the kingdom—scarcely a room—that is not supplied with its box of Lucifer-matches, each box presenting 50 or 100 points of phosphorus, scarcely protected by the thin coating of indurated glue from the oxidising influence of the air. The public is also exposed to fumes, which, though slight, are constantly present, and must be more or less injurious to health.

The Lucifer-match is a simple, beautiful, and efficient contrivance, the result of a long series of improvements on the old sulphur-match of the tinder-box; and it owes its present efficiency, for the most part, to phosphorus. But the chemistry which contrived the Lucifer-match can surely do something to arrest the progress of the frightful disease consequent on its manufacture? A few years ago, M. Schrötter announced the discovery of amorphous phosphorus,—a substance as unlike the common crystalline phosphorus as the sparkling diamond is unlike a lump of black charcoal. The amorphous phosphorus is not soluble in sulphuret of carbon, as common phosphorus is; does not ignite under ordinary friction, or in contact with iodine, as is the case with the common variety; is not poisonous; exhales no injurious acid fumes on exposure to the air. It is, in fact, as distinguished for negative qualities as the ordinary kind is for positive qualities; and yet, when mixed with certain substances and exposed to friction, it explodes with violence. This, then, would appear to be the substance eminently calculated to replace common phosphorus in this manufacture; and when this amorphous phosphorus was first introduced, there was a general expression of admiration at the marvellous powers of chemistry which could thus deprive a substance of all its active noxious properties, and yet leave that substance the same elementary body as before, with the same atomic weight and the same combining powers. In July, 1851, a process was patented, and arrangements were made for manufacturing the amorphous phosphorus on a large scale. Specimens of the new article were sent to the large Lucifer-match manufacturers of this country and of the Continent; yet, up to the present time, no manufacturer has adopted it. In writing on this subject, in a recent Number of my "Cyclopædia," I thought myself justified in condemning the supineness of the manufacturers, and their indifference to the sufferings of their operatives. On submitting my censures to Messrs. Dixon, of Newton-heath, near Manchester, who are probably the largest manufacturers of Lucifer-matches in the world, they assured me of their anxiety to adopt every available means that might be conducive to the health and comfort of their workpeople; and that if they had not yet made use of the amorphous phosphorus, it was simply because they had not been able to make it succeed. In a letter, dated Feb. 7th last, they say: "Whatever future results may be produced from further experiments, we cannot pretend to say, but trust to chemical science to remove the dreadful disease arising from the use of the present phosphorus."

The difficulty in the use of the amorphous phosphorus has been to combine it with other ingredients, so as to produce a paste capable of igniting quietly with moderate friction, and not with those explosive bursts of flame which mark the free use of chlorate of potash. I am happy to be able to state, that the Messrs. Dixon, not deterred by former failures, and even danger from explosions, have, since the date of their last letter to me, succeeded in producing matches which do fulfil the above conditions to so great an extent, as to warrant the hope that in the course of the present year the public will be supplied with matches made with the amorphous phosphorus. The specimens now before me contain a little too much chlorate of potash; with moderate friction they burst out into a white flame, which, however, kindles the wood well. These matches, although not perfect, have the following decided advantages over the common matches: they produce no light in the dark under 400°; they have no smell; are not liable to contract damage, and may be placed on a hot mantel-shelf without taking fire. They are thus adapted to moist and hot climates, and will keep for any length of time without change.

I must apologise for the length of this letter. If the public will take an interest in the manufacture of amorphous matches, the time is not very distant when that form only will be tolerated; and thus the interests of humanity will be served by the extermination of a cruel disease, and the introduction of a safer and better article of domestic use. Yours, &c.,

CHARLES TOMLINSON.

Bedford-place, Ampthill-square, March 8, 1853.

LIBRARIES IN PROVINCIAL TOWNS.

MANCHESTER has a larger number of Libraries than any of our provincial towns. The following return has been compiled by Dr. J. W. Hudson for this Journal:

LIBRARIES.

	Public and Subscription.	*Private Circulating.*	*Total.*
Manchester	42	19	61
Liverpool	26	12	38
Birmingham	16	5	21
Leeds	14	6	20
Newcastle-on-Tyne	8	6	14

The Libraries of Manchester consist of

	VOLS.	VOLS.
42 Private Circulating Libraries, containing		35,000
16 Public Libraries, viz.:		
Athenæum	15,000	
Cheetham College (Free)	21,000	
Free Library, Manchester	22,000	
,, Salford	11,000	
Harpurhey	250	
Lyceum, Ancoats	3,250	
Mechanics' Institution	15,000	
,, Chorlton-road	500	
Miles Platting Mechanics' Institution	2,000	
Philosophical Institution	200	
Portico	14,500	
Salford Mechanics' Institution	3,000	
Subscription—Old Library	30,000	
,, New Exchange	18,000	
,, New Newalls B.	21,000	
Young Men's Christian Association	1,500	
		178,200
Special Libraries:		
Law Library	4,000	
Medical, ditto	2,000	
Foreign, ditto	7,000	
		13,000
VOLUMES		226,200

LOWERING BOATS.

SIR,—I have had the pleasure of submitting to your Society a model of a pair of self-acting hooks, the principle of which is, that instead of the fulcrum or pivot being at the end of the shank, it is placed near the middle, and a ball at the opposite end causes the hook to reverse itself, and detach any object suspended by it.

Let any of the readers of your Journal take a fishing-hook, remove the barb, drill a hole through the centre of the shank, and put a pin through it; a moderate sized shot at the top of the shank will cause the hook to capsize or turn over, when the object suspended by the hook touches the ground or other support. I propose to adopt the principle to the lowering and detaching of boats from ships in case of accident or otherwise, much loss of life having resulted from the boats remaining attached to the ship. The advantages of this arrangement are, first, that it is cheap, costing but a few shillings; and secondly, that it is extremely similar to the present hook, and that sailors would require no instruction in using it. A small pin can easily be inserted to prevent the hook detaching when the boat is hanging at the davits.

I am, Sir, yours, &c.,

C. Butler Clough.

PROCEEDINGS OF INSTITUTIONS.

Annan.—The Fifth Annual Soirée of the Mechanics' Institute was held in the Lady-street Assembly-rooms, on the evening of Friday, the 4th inst. Festoons of evergreens decorated the walls and chandeliers, and an arch of laurel spanned the upper end of the room, from which was suspended an imperial crown of mosses and evergreens. Several appropriate mottos were attached to various parts of the walls. The audience was very large. Col. Dirom, of Mount Annan, occupied the Chair. James Little, Esq., Vice-President, read two letters—the one from William Ewart, Esq., M.P., Vice-President, and the other from Lord Drumlanrig, M.P. for the county. Both expressed their inability to be present, and their best wishes for the success of the Institute. He then read the Report, which stated that the Library had during the last year been considerably increased, and that for the last twelve months there had been a News-room in connection with the Institute, which was supplied with nearly forty papers a week, and was well frequented. During the last quarter there had been an increase of eighty in the number of members over any quarter since the Institute was established. There had been twelve gratuitous Lectures upon interesting subjects, which were well attended. These Lectures were—"Introductory," by the Rev. J. J. Wood, A.M.; "Labour, Wages, and Money," by A. Davidson, Esq.; "Footsteps of the Danes and Northmen in Cumberland and the Border," by R. Fergusson, Esq.; "Every Man his own Landlord," by Rev. H. Mc. B. Brown; "The Art of Oratory, with Illustrations," by F. B. Calvert, Esq., A.M.; "The History of the Kingdom of Hungary," by Major Monins; "Contemporary Sovereigns of Europe," by the Rev. P. Hope, B.A.; "True Greatness of Character," by the Rev. J. Gordon; "Means and Ends," by Mr. Thomas Johnstone; "The Credibility of Craniology," by Robert Elliot, Esq., M.D.; "Annan—Ancient and Modern," by Jas. Little, Esq.; and "John Howard," by the Rev. Jas. Gailey. The following gentlemen then addressed the meeting—the Rev. Mr. Wood; Sheriff Trotter; the Rev. Mr. Riddell; R. Fergusson, Esq.; Dr. M'Culloch. The Chairman, in reply to the vote of thanks which had been passed, said he was happy to have an opportunity of stating how sensible he was of the benefits resulting to the working man from such Societies as the Annan Mechanics' Institute.

Camberwell.—On Tuesday evening last a Lecture was delivered before the members of the Athenæum, by Mr. P. Le Neve Foster, "On Photography and its application to the purposes of Science, Art, and Utility." The Lecturer stated in a popular manner the principles on which the process depended, explaining the construction of the Camera Obscura, the difference between the "negative" and "positive" pictures, and showing how the latter is produced from the former, and copies may be multiplied indefinitely. The various methods of preparing paper and glass, including the collodion process, were adverted to and their peculiar advantages were noticed. The lecturer concluded by pointing out the application of the Art to the microscope, the registering of atmospheric phenomena to engineering and other useful purposes. The lecture was illustrated with apparatus and a variety of beautiful specimens including negatives, which attracted much attention. A vote of thanks to the Lecturer was passed unanimously.

Dunmow.—The second course of Lectures for the present season, at the Literary and Scientific Institution, was opened on Wednesday evening, February 16th, by the Rev. T. B. Sainsbury, B.A., London, with a Lecture on the "Catacombs of Rome," illustrated by upwards of forty large diagrams. The company expressed their gratification by repeated tokens of applause; and at the close of the Lecture the thanks of the meeting were voted to the Reverend Lecturer.

Halsted.—The Rev. J. C. Coleman, of Gestingthorpe, delivered a Lecture on "The Sea" to the members of the Halsted Mechanics' Institute, on Friday evening. He commenced by giving an analysis of the various substances contained in a glass of sea water, more particularly that of the British Channel, and explained the different degrees of saltness of sea water on our own shores in different seasons of the year. After alluding to the depth of the ocean, and to some of its principal inhabitants, as the whale and the shark, he dilated upon the proportions of sea and land composing the globe,—describing the results that would ensue, if instead of seven parts water and three parts land, it were in an inverse ratio, and how the fertility of the earth depended on what was termed the barren ocean. The tides, the action of the moon upon the waters, the attraction of the sun, and the flow of the tides in different parts of the world, were next explained; and the Lecturer then described the law of storms, whirlpools, and waterspouts. In acknowledging a vote of thanks, which was carried by acclamation, Mr. Coleman remarked that by "teaching we learn, and thought delivered is more possessed."

Plymouth.—On Wednesday last, Mr. Gore delivered a Lecture, at the Mechanics' Institution, "On the Coalfields of this Kingdom," illustrated by a variety of plans and sections of various coal-pits, and by models of the engine-house, and mode of raising coal from the pit, and of the machinery, &c., connected with the operations of the miner, and the manufacture of coke. On Friday last, Mr. J. A. Hardcastle, late M.P. for Colchester, read a paper "On the History of the English Language," in which he traced the rise and gradual progress of the language. The subject was illustrated by readings from various authorities, which were afterwards carefully analysed, for the purpose of pointing out the different proportions of words in use, derived from the Celtic, the Anglo-Saxon, the Norman-French, the Greek, and the Latin tongues.

Sevenoaks.—On Thursday, March 10th, Mr. Yapp delivered a Lecture to the members and friends of the Literary and Scientific Institution, on "Drawing and its Uses, with Hints on Taste and Ornamental Design;" being the first Lecture delivered at this Institution through the

medium of the Society of Arts. In the course of the Lecture, Mr. Yapp made some remarks upon several articles sent to the Great Exhibition, treating largely upon the principles of design, and the application and misapplication of ornament. It is hoped that this Lecture will stimulate the Committee to consider the propriety of establishing a Drawing-class in connection with the Institution.

TONBRIDGE.—On Friday, the 11th inst., Mr. Yapp delivered his Lecture, "Drawing and its Uses," to the members of the Literary Institution. The Lecturer remarked that the want of artistic education of the eye and hand in this country was the main cause why we did not furnish designers equal to our neighbours; and yet nothing could be more easily acquired than a power of drawing. In explaining different objects to children, it was found almost impossible to convey correct notions except by these means; at all events, they were far simpler and more comprehensible than mere words

TO CORRESPONDENTS.

Notice.—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

Sevenoaks.—Vide Advertisements in Nos. 1 and 2 of the Society's Journal.

H.'s Letter on the Decimal Currency next week.

QUESTIONS FROM CORRESPONDENTS.

Bookbinding.—Is there any self-acting machine used by bookbinders for sewing the sheets together; and if so, is it a patent or not; and what is its name?—[*No.* 48.]

Smoke Nuisance.—What are the causes that prevent the carrying out of the Act of Parliament for remedying the smoke nuisance; and how is it possible to enforce that Act?—*R. W.* [*No.* 49.]

MISCELLANEA.

INSTRUMENT FOR MEASURING STEAM PRESSURE.—Mr. Hulford, of H. M. Dockyard, Woolwich, has invented an instrument for ascertaining from an indicator-card the steam pressure on the piston of a steam-engine. The indicator-card being placed on the board so that the atmospheric lines coincide with the marks on the retaining springs, the triangular scale was placed at the bottom of the figure, and the side roller made to revolve until the spiral line on it interseeted the edge of the scale, in which position the roller was fixed. The distances between the steam and vacuum lines were taken by sliding the scale along the figure, and ten or twenty divisions might be taken, according to the degree of accuracy required; the sum of the distances, divided by their number, gave the mean pressure on the piston. A great saving of time, in the measurement of all irregular figures, evidently resulted from the use of the instrument, and its simplicity and low price were also points in its favour.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 10th March*, 1853.
177. Hops—Accounts.
199. Ships (Navy)—Return.

Delivered on 11th March.
191. Local Acts—Reports of the Admiralty.
211. Bill—Pilotage.

Delivered on 12th and 14th March.
180. Children in Workhouses—Abstract of Return.
182. Turnpike-roads (South Wales)—Statements of Receipts and Expenditure.
204. Colonial Postage—Correspondence.
218. Committee of Selection—Third Report.
170. Railway and Canal Bills—Second Report from Committee.
208. Lighthouses, &c.—Copy of a Letter from his Royal Highness Prince Albert, &c.
212. Bills—Probates of Wills and Grants of Administration.
223. ,, —Aggravated Assaults.
Prisons in Scotland—Fourteenth Report of the General Board of Directors.

Delivered on 15th March.
171. Railway Accidents—Return.
203. Bridgenorth Election—Minutes of Evidence.
207. Electors and Polling-places (Scotland)—Return.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 11th March, 1853.

Dated 31st Jan.
243. D. S. Brown—Improvements in barometers, &c.
248. R. Palmer—Cutting and reducing to pulp turnips and other roots, &c., and also crushing apples for cider.

Dated 10th Feb.
362. R. Roger—Motive power.

Dated 17th Feb.
411. J. C. Brown—Propelling vessels.
412. W. B. Adams—Railways.
418. T. C. Ogden—Spinning cotton, &c.

Dated 22nd Feb.
451. P. F. Gougy—Skidding wheels.
453. J. C. Cochrane—Production of figured fabrics.

Dated 23rd Feb.
455. J. Smith—Raising and forcing water, &c.
457. E. Albrecht—Transmitting and reflecting light.
459. R. Milligan—Washing slivers of wool.
461. A. Willard—Butter machine.

Dated 24th Feb.
463. J. Green—Economical self-basting cooking apparatus.
464. W. Spence—Thrashing and winnowing corn.
465. H. Walmsley and T. Critchley—Stopping railway trains, and communicating from one part of a train to another.
466. P. M'Lellan—Thrashing machinery.
467. W. Johnson—Manufacturer of caoutchouc. (A communication.)
469. T. De la Rue—Improvements in producing ornamental surfaces to paper, &c.
470. E. A. Hermann—Machinery for manufacturing woollen cloth. (A communication.)
471. J. Lawrence—Drying and preparation of malt, meal, seeds, corn, &c.
472. T. B. Jordan—Machinery for planing slate.

Dated 25th Feb.
473. F. Preston—Manufacture of machinery used in spinning cotton, &c.
475. B. Price—Construction of furnaces, &c., for heating and evaporating.
476. J. Grist—Machinery for manufacture of casks, &c.
477. W. Symington—Preserving milk, &c.
478. J. P. de la Fons—Skids and drags for omnibuses.
479. T. Richardson—Manufacture of compounds of phosphoric acid.
480. T. M. Nicholls—Emission or re-action engines.
481. A. F. Cossus—Filters.
483. F. Goodell—Distilling, bleaching, and deodorising rosin oil. (Partly a communication.)

Dated 26th Feb.
484. C. N Wilcox—Extracts from elder-tree.
485. J. J. Fréchin—Locomotive engines.
486. W. M. Shaw—Locomotive boilers
487. J. Brandeis—Manufacture and refining sugar.
488. M. H. Blanchard—Earthenware pipes, &c.
489, W. E. Newton—Indicating rotations of wheels. (A communication.)
490. E. Thornton—Kitchen boilers and flues.
491. Lord Berriedale—Weaving.
492. R. Griffiths—Propelling vessels.
493. C. Tetley—Power by steam and air.
494. C. Tetley—Manufacture of bobbins.
495. S. Varley—Communication between guard and engine driver.
496. Earl of Dundonald—Useful products by combination of bituminous, resinous, and gummy matters.

Dated 28th Feb.

498. J. Murphy—Railway trucks, &c.
500. M. J. Roberts—Manufacture of mordants, partly applicable to manufacture of a polishing powder.
502. G. Duncan—Steam boilers.
504. J. Major—Synovitic lotions.

Dated 1st March.

506. R. Stephenson, jun.—Locomotive engines.
508. J. Bethel—Preserving wood.
512. W. Rowett—The cylinder paddle-wheel.
514. J. M'Adams—Printing on leaves of books their designations, numbers, &c., &c.

Dated 2nd March.

516. L. Hill, jun.—Motive power. (A communication.)
518. H. A. Holden, A. Knight, E. Bull, and J. Banfield—Signals between guard and driver.
520. A. Soyer—Soyer's Ozmazome food.
522. E. D. Moore—Treating extract of malt and hops.
524. A. A. de R. Hely—Door or finger-plate.
526. M. Vetillart—Drying yarns.

Dated 3rd March.

528. W. Clark—Propelling and steering vessels.
530. S. O'Regan—Consuming smoke.
534. M. Billing—Metallic bedsteads.
536. S. Colt, A. Blower. (A communication.)
538. S. Colt—Rotating breech for fire-arms. (Partly a communication.)
540. W. E. Newton—Primers for fire-arms.
542. T. Crick—Manufacture of boots, shoes, &c.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

577. Revolving or repeating fire-arms.—7th March, 1853.

WEEKLY LIST OF PATENTS SEALED.

Sealed 12th March, 1853.

251. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in sewing machines.
287. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in steam-boilers.
301. Samuel Smith, of Swinton, Manchester—Improvements in looms for weaving.
575. Pierre Bernardet de Lucenay, of Paris, France, and 4, South-street, Finsbury—Invention of the production of photographic images by means of artificial light.
982. Peter Armand le Comte de Fontaine Moreau, of 4, South-street, Finsbury—Improvements in constructing the bars of furnaces and grates. (A communication.)

Sealed 16th March.

53. Thomas Browne Dalziel, of Glasgow—Improvements in the treatment or manufacture of textile fabrics or materials.
56. John Finlay, of Glasgow—Improvements in grates and fireplaces, or apparatus for the generation of heat.
64. Henry Richardson Fanshawe, of Arthur-street, Old Kent-road—Improvements in shawls, scarfs, neckerchiefs, handkerchiefs, mantles, sails or sail-cloth, table-cloths and table-covers, napkins, and umbrella and parasol-tops and covers, and in an improved loom for weaving, applicable to the said improvements in respect to some of the said articles.
101. Thomas Allan, of Adam-street—Improvements in the application of carbonic acid gas to motive purposes.
106. Thomas Allan, of Adam-street—Improvements in propelling.
181. William Edward Newton, of 66, Chancery-lane—Improvements in governors, or regulators, for regulating the pressure of gas as it passes from the main or other pipes to the burners.
207. William Donald Napier, of George-street, Westminster, and William Lund, of Cornhill—Improvements in apparatus for steering vessels.
219. Arthur Richard Burr, of Halesowen, Worcester—Improvements in making gun and pistol-barrels, applicable to the manufacture of other kinds of tubes.
231. George Walker Nicholson, of Pendleton, Lancashire—Improvements in screw-bolts, nuts, and washers, and in the machinery or apparatus for making the same.
234. John Balmforth, William Balmforth, and Thomas Balmforth, of Clayton, Lancashire—Improvements in steam-boilers, and in fixing the same.
235. Adam and John Booth, of Manchester—Improvements in plaiting or braiding-machines, which machines are applicable to manufacturing webs for making door and other mats.
259. George Walker Nicholson, of Pendleton, Lancashire—Improvements in vices, and in the means or method used for fixing the same.
260. William Coles Fuller, of Bucklersbury, and George Morris Knevitt, of Argyll-street, New-road—Improvements in applying India-rubber or other similar elastic substances as springs for carriages.
262. Robert Mortimer Glover, and John Cail, of Newcastle-on-Tyne—Improvements in miners' or safety lamps.
286. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in smoothing-irons.
305. John Talbot Tyler, of Mount-street, Grosvenor-square—Improvements in hats, and in the preparation of plush or other covering used in the manufacture of hats.
321. Samuel Hardacre, of Manchester—Improvements in machinery or apparatus for blowing, scutching, opening, cleaning, and sorting cotton, wool, and other fibrous substances, parts of which improvements are applicable to other purposes.
322. George Gent, and Samuel Smith, of Northampton—Invention of a fruit-cleaning and dressing-machine.
341. Edward Simons, of Birmingham—Improvements in lamps.
347. Auguste Edouard L. Bellford, of 16, Castle-street, Holborn—Improvements in sewing cloth and other materials.
354. Joseph Walker, of Dover, Kent—Improvements in machinery for crushing and bruising malt, grain, and seeds.
356. Joseph Robinson, of Southampton—Improvements in ventilators.
515. Robert William Mitcheson, of Garford-street—Improvements in anchors.
529. Robert William Mitcheson, of Garford-street—Invention of an improved safety hook.
588. Alfred Charles Hervier, of Paris, France, and 4, South-street, Finsbury—Improvements in the application of centrifugal force to propelling on water.
573. John Norton, of Cork—Improvements in blasting.
615. Charles Dickson Archibald, of Burland Hall, Milnthorpe, Westmoreland—Improvements in lighting and heating.
739. Amory Hawkesworth, of Abbey-road, Torquay, Devon—Improvements in lifeboats.
1120. Jean Baptiste Niomier, of Rue de Marseille, and Charles Constant Boutigny, of Rue de Flandre, of La Vilette, France—Improvements in distilling fatty matters.
1182. James Webster, of Leicester—Improvements in the manufacture of springs.
64. Michael Fitch, of Chelmsford, Essex—Improvements in ovens.
74. Thomas Cottrill, of West Bromwich, Staffordshire—Improvements in the manufacture of certain salts of soda.
92. William Brown, of Glasgow—Invention of an improved method of treating coal and bituminous substances, and for improvements in the treatment of their volatile products.
94. Edward Wills Wren, of Walkhampton, Devonshire—Invention for the manufacturing of bricks, pipes, tiles, imitation stone, and peat bricks for fuel, by means of a machine and arrangements of machinery, titled a central circular and horizontal motion.
103. James Stewart Kincaid, of Dublin—Improvements in ascertaining and registering the number of persons entering or quitting omnibuses or other vehicles or vessels, which are applicable in whole or in part to buildings or other places.
108. Peter Alexander Halkett, of Richmond-hill—Invention of an improved construction of inkstand.
117. Henry Henson Henson and William Frederick Henson, of Hampstead—Improvements in signalling on railways, and in the apparatus used therein.
125. Peter Fairbairn and Samuel R. Mathers, of Leeds, Yorkshire—Improvements in machinery for drawing the sliver and rove of flax, hemp, and tow.
129. William Vincent, of Noakes and Vincent, of 195, Bricklane, Spitalfields—Improvements in cocks or taps.
131. Joseph Rock Cooper, of Birmingham—Improvements in firearms.
144. William Riddle, of East Temple-chambers—Improvements in ornamenting walls, ceilings, and other surfaces.
153. James Middlemass, of Edinburgh—Invention of the application of a new material to the construction of portable houses and other buildings.
160. John Chubb and John Goater, of St. Paul's Churchyard—Improvements in locks and latches.
177. John Randolph and John Elder, of Randolph, Elder, and Co., of Glasgow—Improvements in propelling vessels.
188. John Sangster, of Cheapside, City—Improvements in umbrellas and parasols. (A communication.)

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
March 11	3431	Improved Sausage-machine	William Brookes	7, Little Somerset-street, Aldgate.
,, 16	3432	Seamless Block Boot	George Clarke	Kingston-on-Hull.